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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/796,592

03/05/2004

Mehdi Namazian

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RICHARD E. BACKUS LAW OFFICE
887 - 28TH AVE.
SAN FRANCISCO, CA 94121

EXAMINER

SINGH, PREM C

ART UNIT

PAPER NUMBER

1764

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/22/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/796,592

Applicant(s)

NAMAZIAN ET AL.

Examiner

Prem C. Singh

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1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 20-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/27/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-19, drawn to a process of reformulating fuel, classified in class 208, subclass 79.
 - II. Claims 20-25, drawn to an apparatus for reformulating fuel, classified in class 422, subclass 187.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions in group I and II are related as process and apparatus for its practice.

The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice a materially different process, for example, crude distillation followed by thermal cracking.

Because these inventions are independent or distinct for the reasons given above and because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with Attorney Richard E. Backus on 01/29/07 a provisional election was made without traverse to prosecute the invention of claims 1-19.

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4. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

5. Claim 4 is objected to because of the following informalities:

Claim 4 (line 2): A word --"from"-- is missing between --"selected"-- and --"the group"--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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7. Claims 7 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "step of burning" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 19 recites -- "wicking the fuel"--. It is not clear whether this "fuel" refers to -- "a fuel" -- in claim 8 (line 1) or the -- "second fuel" -- in line 1.

Claim Rejections - 35 USC § 102

8. (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 1-4, 8, 10-15, 17, and 18 are rejected under 35 U.S.C. 102(a) as being anticipated by Shaaban et al (US 2004/0006914 A1).

10. With respect to claim 1, Shaaban discloses a compact distillates fuel processor with effective sulfur removal process. The invention discloses, "A distillate fuel feed stream is directed into a separation assembly, in which the fuel is converted and separated into two process streams; a gas stream which is rich in aromatics and depleted in sulfur relative to the feed, and a liquid residue stream which is rich in aliphatic and sulfur relative to the feed. The gas stream from the separation assembly is directed first to the desulfurization assembly, where hydrogen sulfide is removed by adsorption, and then to the reforming assembly, in which the desulfurized gas is mixed

with steam and converted in a reforming reactor to produce a hydrogen-rich product stream." (Page 2, paragraph 0022). Shaaban further discloses that the steam-reformed fuel is used in fuel cells (See page 1, paragraph 0002).

11. With respect to claims 2 and 17, Shaaban discloses, " Components of the apparatus for separation of the fuel feed stream into gas and liquid streams may include any or all of a vaporizer, a fractionator, a catalytic cracking reactor, and a gas/liquid separator." (Page 2, paragraph 0023).

12. Claims 3 and 11 have all the limitations of claim 1, and discussed before.

13. With respect to claims 4 and 12, Shaaban discloses, "Components for the apparatus for desulfurization of the light aliphatics-rich gas stream may include any or all of a high temperature adsorber, a low temperature adsorber, and apparatus for regeneration of the adsorbers." (Page 3, paragraph 0024).

14. Claims 8 and 10 have all the limitations of claim 1, and in addition, requires a holding vessel for the heavy fractionate. Shaaban discloses in figures 1-4 a fuel reservoir (20) which is used to store the liquid fuel and supply to the combustion reactor (22).

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15. Claim 13 has all the limitations of claims 1, 8, and 11, and further requires driving an engine or combustor that has catalytic components. Shaaban discloses that the steam-reformed fuel is used in fuel cells (See page 1, paragraph 0002). It is to be noted that fuel cells have catalytic components.

16. Claim 14 has all the limitations of claims 1 and 8, and discussed before.

17. Claim 15 has all the limitations of claims 1 and 8, and further requires adding the heat from the burning step into the reformulating step.

Shaaban mentions, "Air-fuel mixture can be combusted in a radiant burner, in which heat produced by combustion reactions occurring within the pores of a refractory burner element is transferred by radiation from the burner element to process streams." (Page 6, paragraph 0058). Also Shaaban adds, "Steam generation and steam reforming reactions are endothermic processes that use heat supplied from the combustion assembly (130)." (Page 4, paragraph 0045).

18. Claim 18 has all the limitations of claims 1 and 8 and requires burning the light fractionate to drive an engine or a combustor.

Shaaban discloses, "The first and second embodiments of the invention, as shown in figures 1 and 2, produce a hydrogen-rich product stream, which may be directed to the anode of a fuel cell for electric power generation." (Page 6, paragraph 0063).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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22. Claims 5-7, 9, 16, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaaban et al (US 2004/0006914 A1).

23. With respect to claims 5 and 16, Shaaban discloses, "In this embodiment, a hydrogen-rich product stream (113), which contains hydrogen, carbon dioxide, methane, carbon monoxide, and other trace species, is directed from the reforming reactor (42) to the hydrogen purifier component (44), in which hydrogen is selectively separated into a hydrogen-rich product stream (313) and a hydrogen-depleted reject stream (314) which is vented to the ambient as a byproduct. The hydrogen purifier (44) may also include any of several catalytic reactors, including low temperature gas shift, preferential oxidation, or methanation reactor." (Page 4, paragraph 0048). Although Shaaban does not disclose the temperature of the first and second reformat steps, it would have been obvious to one skilled in the art at the time the invention was made to modify Shaaban invention and use standard temperature conditions, including the claimed temperatures of 600 and 650°C, for proper control of the reforming steps.

24. With respect to claims 6 and 7, Shaaban discloses, "The apparatus for combustion of the liquid residue stream may include an air blower, a radiant burner, a catalytic combustion reactor, and a water recovery component." (Page 3, paragraph 0026). "Air-fuel mixture can be combusted in a radiant burner, in which heat produced by combustion reactions occurring within the pores of a refractory burner element is transferred by radiation from the burner element to process streams." (Page 6,

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paragraph 0058). Shaaban further adds, "Steam generation and steam reforming reactions are endothermic processes that use heat supplied from the combustion assembly (130)." (Page 4, paragraph 0045). Although Shaaban does not specifically mention the details of the combustion process in a radiant burner, it is known to those skilled in the art.

25. With respect to claim 9, Shaaban does not disclose heat exchange of heavy fractionate with the fuel before fractionation.

However, the invention does disclose, "Heat produced in a catalytic combustion reactor may be transferred to process streams by conduction, convection, radiation or any combination of these." (Page 6, paragraph 0059). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Shaaban invention and extract heat from the heavy liquid by the incoming fuel before going to the fractionator to conserve heat and require less heat during fractionation.

26. With respect to claim 19, the examiner understands that the Applicant refers to the heavy fuel after fractionation step.

Shaaban discloses, "The apparatus for combustion of the liquid residue stream may include an air blower, a radiant burner, a catalytic combustion reactor, and a water recovery component." (Page 3, paragraph 0026). Shaaban also mentions, "Air-fuel mixture can be combusted in a radiant burner" (See page 6, paragraph 0058). Since Shaaban is using a turbine in the fourth embodiment to run a compressor for

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pressurized air (See page 6, paragraph 0062), it would have been obvious to one skilled in the art at the time the invention was made to modify Shaaban invention and use the fuel-air mixture in the turbine to run the compressor for compressed air requirement.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sanger et al, US Patent 6,793,698.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS /020207



Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700